

FIGS. 6A and 6B are top plan views of the rear portion of the liquid manure spreader shown in FIG. 3, wherein the two external manure discharging pipes are respectively pivoted in an outwardly (6A) and inwardly (6B) position.

5 **Detailed Description of the Invention**

As aforesaid, the liquid manure spreading tool bar 1 for use in a manure spreader according to a preferred embodiment of the invention as shown in the accompanying drawings is intended to be used for spreading manure via at least one discharge pipes 51 to 53 connected to a manure distributor 30 fed by a vertically extending telescopic conduit 40 connected to
10 a manure pump.

In this connection, even though three discharging pipes 51 to 53 are shown in the drawings, the number of discharging pipes could vary. In other words, the liquid manure spreading tool bar according to the present
15 invention could be operational with only one discharging pipe. However, the use of more than one discharging pipes is advantageous inasmuch as it permits to spread more manure onto the ground in a wide variety of patterns.

As shown in Figure 3, the liquid manure spreading tool bar 1 can be mounted onto a manure spreader which itself comprises a manure tank 10
20 mounted onto a wheeled chassis operatively hitchable to a farm tractor. The liquid manure spreading tool bar 1 also comprises a supporting frame 20 externally mounted onto the tank of the manure spreader in such a manner as to be movable up and down with respect to said tank. The manure distributor 30 is mounted onto this frame. The manure pump has an inlet
25 located within the manure tank 10 and an outlet pipe 17 connected to the vertically extending telescopic conduit 40. Advantageously, a manually operable valve (not shown) can be mounted in the outlet pipe 17 to restrict its size and thus adjust the discharge rate of the pump. A manually operable drain 18 (see FIG. 3) may also be mounted at the bottom portion of the outlet
30 pipe 17 of the manure pump to empty this pipe 17 and the telescopic conduit 40 whenever necessary.

The vertically extending telescopic conduit 40 is made of a rigid material. As aforesaid, it has one end 41 connected to the outlet pipe 17 of the pump and another end 42 connected to the inlet 31 of the manure distributor 30. Such allows the manure which is pumped from the tank, to be
5 fed to the distributor whatever the vertical position of the supporting frame 20.

In other words, the end 42 of the vertically extending telescopic conduit 40 is connected to the inlet 31 of the manure distributor 30 while the other end 41 of the telescopic conduit 40 is connected to the outlet pipe 17 of the manure pump.

10 In practice, depending on the position of the outlet of the pump within the tank, the manure distributor 30 could alternatively be connected to the bottom end of the telescopic conduit 40 while the outlet of the pump would be connected to the top end of the same conduit. Of course, the discharging pipes would then have to be connected to the bottom of the manure
15 distributor which would then be fed from its top.

As is shown (see in particular FIGS. 4A and 4B), the supporting frame 20 is externally mounted onto the tank 10 in such a manner as to be movable up and down with respect to the tank. The manure distributor 30 that is mounted on the supporting frame comprises an inlet 31 for receiving the
20 manure from the vertically extending telescopic conduit 40 and at least one outlet. Of course, the number of outlets corresponds to the number of discharging pipes.

As aforesaid, the manure discharging pipes 51, 52 and 53 are each connected to the outlets of the manure distributor 30. Like the vertically
25 extending telescopic conduit 40, each discharging pipes is made of a rigid material. As shown in Figure 3, each manure discharging pipes 51 to 53 preferably has a starting portion 58 projecting upwardly on top of the manure distributor 30 and a subsequent portion 59 extending downwardly without any horizontal sections. This particular feature is advantageous since it allows
30 manure to constantly flow by gravity in a downwardly direction even when the pump is stopped, thus avoiding any problem of jamming in the discharging pipes.

Advantageously, an upwardly projecting air vent 61 can be connected to the upper part of each portion 59 in order to prevent unequal vacuuming of the corresponding discharging pipe and to allow it to get empty by gravity as soon as the manure pump is stopped.

5 As aforesaid, each of the discharging pipes 51 to 53 is also connected to the supporting frame. Such is advantageous in that it allows the discharging pipe(s) 51 to 53 to be vertically moved up and down together with the supporting frame 20 and the manure distributor to adjust the spreading width. A representation of these two positions is shown in Figures
10 4A and 4B.

Preferably, the up and down movement of the supporting frame 20 between a low position and a high position with respect to the tank 10 is obtained by suitable means which preferably consist of a hydraulic system 21. However, other means could be used for vertically moving the supporting
15 frame, such as an electric system or a crank.

When comparing Figures 4A and 4B, it becomes apparent that the supporting frame 20 can be lowered or raised, thus affecting the clearance of the discharging pipes with respect to the ground. It also becomes apparent that the difference of height between the low position (4A) and high position
20 (4B) is limited to the length of the vertically extending telescopic conduit 40. Of course, the lowest position is achieved when the vertically extending telescopic conduit 40 has not been extended at all (i.e. the compacted form), and highest position (see Figure 4B) is achieved when the vertically extending telescopic conduit 40 has been fully extended. Of course,
25 intermediate positions (i.e. when the vertically extending telescopic conduit has not been fully extended) can also be achieved to adjust both the spreading width and pattern.

As it is better shown in Figures 5 and 6, each of the manure discharging pipe(s) 51 and 53 has a bottom portion 56 that is pivotable
30 between an inwards position (see Figure 6B) and an outwards position (see Figure 6A). In the inwards position, the bottom portion 56 of the at least one manure discharging pipes 51 and 53 extends adjacently to the manure tank. In the outwards position, pipes 51 and 53 extend away from the manure tank for spreading manure at a predetermined distance on each side of the tank.